REMARKS/ARGUMENTS

Claims 13-22 and 31-35 remain in the application. Claims 23-30 are cancelled. New claims 36-43 have been added.

Election/Restrictions

Claims 1-12 are withdrawn from further consideration pursuant to 37 CFR 1.142(b). Election was made without traverse in the reply filed on March 26, 2007.

Applicant hereby reserves without traverse the right to file non-elected claims 1-12 in unamended form by divisional application.

Drawings

New Figures 6a and 6b are submitted herewith. Applicant has aligned the figures with the edges of the page. No new subject matter has been added.

Claim Rejections – 35 USC § 102

Claims 13, 22-23, 27, and 31-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Lockwood et al. (US Patent 6,477,489).

Having regard to independent claim 13, Applicant discloses and claims a method for encoding an audio signal comprising the features of "*determining an inharmonicity index in dependence upon the received audio signal*" and "*determining a masking threshold in dependence upon the inharmonicity index using a psychoacoustic model*".

These features define a method for determining a masking threshold in dependence upon the inharmonicity of the received audio signal. In a first step, an inharmonicity index of the received audio signal is determined by applying a harmonic analysis to the received audio signal, as disclosed, for example, in paragraph [0049] of the description of the present application, to determine a level of inharmonicity of the received audio signal. In a following second step, a masking threshold is determined in

dependence upon the inharmonicity index of the received audio signal using a psychoacoustic model by adjusting the psychoacoustic model based on the inharmonicity index, as disclosed, for example, in paragraph [0052] of the description of the present application.

Cited reference Lockwood et al. teaches a method for adaptive noise suppression for improving the performance of conventional spectral subtraction methods for noise reduction in a digital speech signal. The conventional spectral subtraction methods subtract a portion of a received signal's spectrum below a predetermined noise level and, as a result, also remove valid portions of the received signal, introducing so-called "musical noise". Lockwood et al. teach a method for reducing the musical noise when a harmonic structure - i.e. vowel - exists in the received signal by adjusting suppression levels for these portions of the received signal in a second subtraction step. In particular, Lockwood et al. teach detection of a harmonic structure by simply identifying a pitch in voice portions of the received signal and adjusting suppression levels for the spectral component at the pitch frequency and its integer multiples.

Applicant respectfully submits that cited reference Lockwood et al. does not teach anything similar to the above features of claim 13. In particular, in col. 8, lines 52-55 and equation (10), as cited by the Examiner, Lockwood et al. teach generation of spectral components of a noise-suppressed signal by applying a first suppression filter H to the original frequency components of each signal frame, NOT "*determining an inharmonicity index in dependence upon the received audio signal*". Furthermore, cited reference Lockwood et al. is silent about "*inharmonicity*". In col. 8, lines 56-59, as cited by the Examiner, Lockwood et al. teach determination of a masking curve by applying a psychoacoustic model and refer to existing models, for example, J.D. Johnston model, in col. 8, line 65, but do NOT teach "*determining a masking threshold in dependence upon the inharmonicity index using a psychoacoustic model*". Neither cited reference Lockwood et al. nor J.D. Johnston teach use of inharmonicity information of the received audio signal for determining a masking threshold.

Applicant respectfully submits that the method for encoding an audio signal as disclosed and claimed in claim 13 is not anticipated by cited reference Lockwood et al.

Having regard to dependent claim 22, Applicant respectfully submits that cited reference Lockwood et al. does NOT teach anything similar to the features of "*determining a temporal masking index in dependence upon the received audio signal*" and "*determining a masking threshold in dependence upon the inharmonicity index and the temporal masking index using a psychoacoustic model*" but, in col. 6, lines 33-67 and in col. 7, lines 1-26, as cited by the Examiner, updating of estimates of the noise on a band by band basis.

Furthermore, claim 22 depends on a claim that is believed to be allowable and as such is also allowable.

Having regard to independent claim 31, Applicant discloses and claims a method for encoding an audio signal comprising the features of "*determining a masking index in dependence upon human perception of natural characteristics of the audio signal by considering at least a wideband frequency spectrum of the audio signal*" and "*determining a masking threshold in dependence upon the masking index using a psychoacoustic model*".

These features define a method for determining a masking threshold based on at least a wideband frequency spectrum. The determination of a masking threshold based on at least a wideband frequency spectrum considers the relationship among the spectral components over the at least a wideband frequency spectrum. This is in contrast to existing masking models, such as the J.D. Johnston model, in which spectral components are processed individually to identify tonal and noise-like components.

Applicant respectfully submits that cited reference Lockwood et al. does not teach anything similar to these features but, in col. 8, lines 64-67 to col. 9 line 1, refers to existing models and in particular the J.D. Johnston model.

Having regard to dependent claim 32, Applicant respectfully submits that cited reference Lockwood et al. does NOT teach anything similar to the feature of "*wherein the wideband frequency spectrum is the complete frequency spectrum of the audio signal*" for determining a masking threshold, but a number of frequency bands covering the bandwidth of the received signal for processing the received signal.

Furthermore, claim 32 depends on a claim that is believed to be allowable and as such is also allowable.

Claims 23 and 27 have been cancelled.

Claim Rejections – 35 USC § 103

Claims 24-26, 28-30, and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lockwood et al. (US Patent 6,477,489).

Claims 24-26 and 28-30 have been cancelled.

Claim 33 depends on a claim that is believed to be allowable and as such is also allowable.

Having regard to dependent claim 34, Applicant respectfully submits that cited reference Lockwood et al. does NOT teach anything similar to the feature of "*wherein the non-linear masking index is a temporal masking index*" but, in col. 6, lines 33-67 and in col. 7, lines 1-26, as cited by the Examiner, updating of estimates of the noise on a band by band basis.

Having regard to dependent claim 35, Applicant respectfully submits that cited reference Lockwood et al. does NOT teach anything similar to the feature of "*wherein the non-linear masking index is an inharmonicity index*" but, in col. 8, lines 56-59, as cited by the Examiner, determination of a masking curve by applying a psychoacoustic model such as, the J.D. Johnston model.

Furthermore, each of claims 34 and 35 depends on a claim that is believed to be allowable and as such are also allowable.

New independent claim 36 defines a method for determining a masking threshold comprising the features of claim 14, deemed allowable by the Examiner.

New dependent claim 37 defines the step of processing the audio signal in dependence upon the masking threshold determined in independent claim 36.

New dependent claims 38 and 39 define the same features as dependent claims 20 and 21.

New independent claim 40 defines a method comprising the feature of "*determining an inharmonicity index in dependence upon the received audio signal*;" - which is the same as in independent claim 13 - followed by the features of "*using the inharmonicity index adjusting a psychoacoustic model*;" and "*determining a masking threshold using the adjusted psychoacoustic model*" - which is described in paragraph [0052] of the description of the present application. Applicant respectfully submits that the cited references do not teach anything similar to these features.

New dependent claims 41 to 43 define the same features as dependent claims 20 to 22.

No new subject matter has been added.

Allowable Subject Matter

Claims 14-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant wishes to thank the Examiner for indicating the allowability of claims 14-21 if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant respectfully submits that claims 14-21 each depend on a claim that is believed to be in allowable form and as such are allowable, but will reconsider rewriting the claims upon rejection of the base claims and any intervening claims.

Applicant looks forward to receiving favourable consideration of the instant application.

Please charge any additional fees required or credit any overpayment to Deposit Account No. 50-1142.

Respectfully submitted,

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